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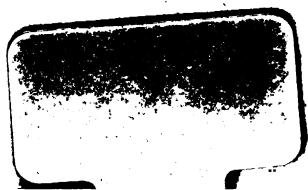
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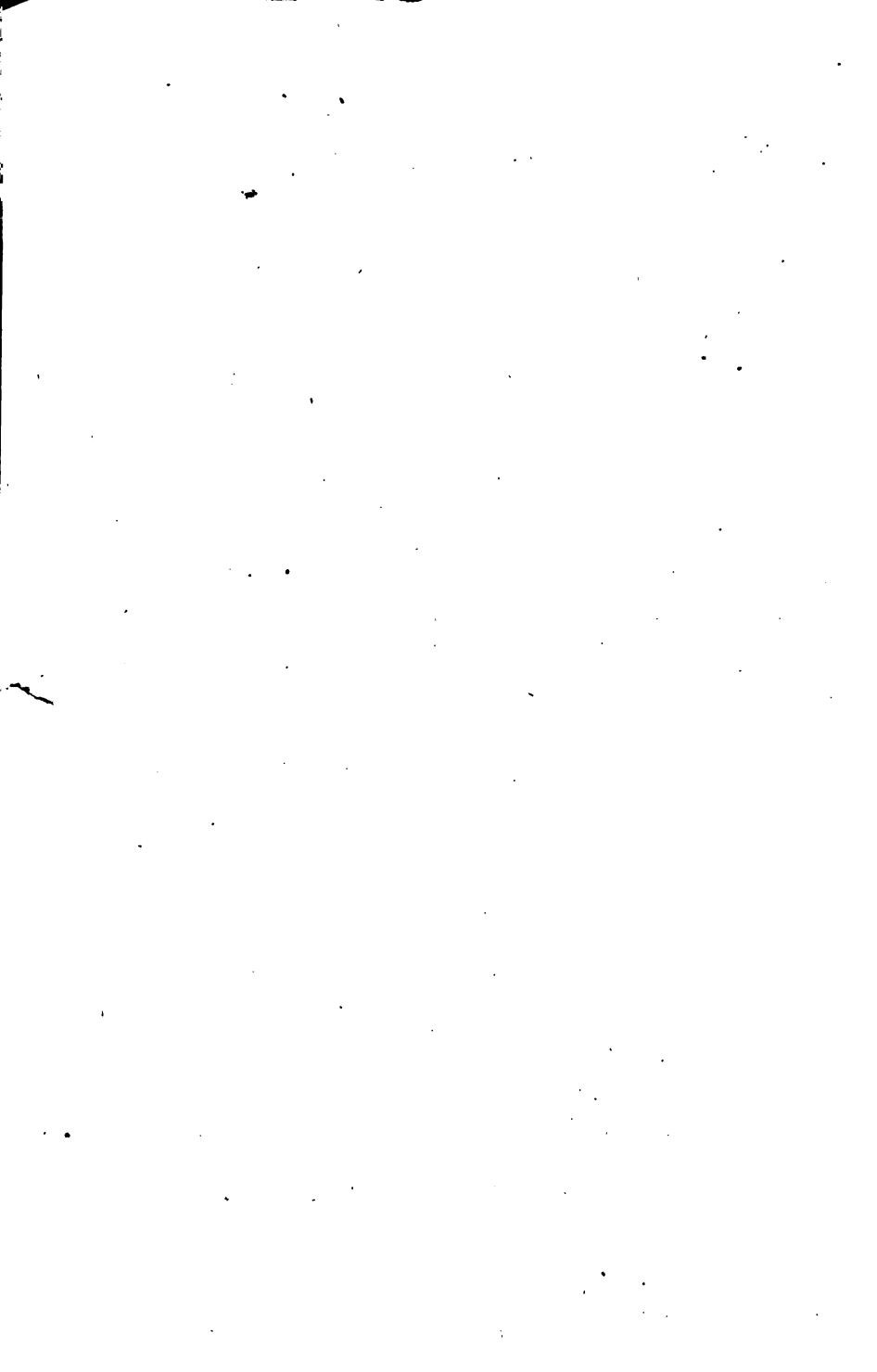
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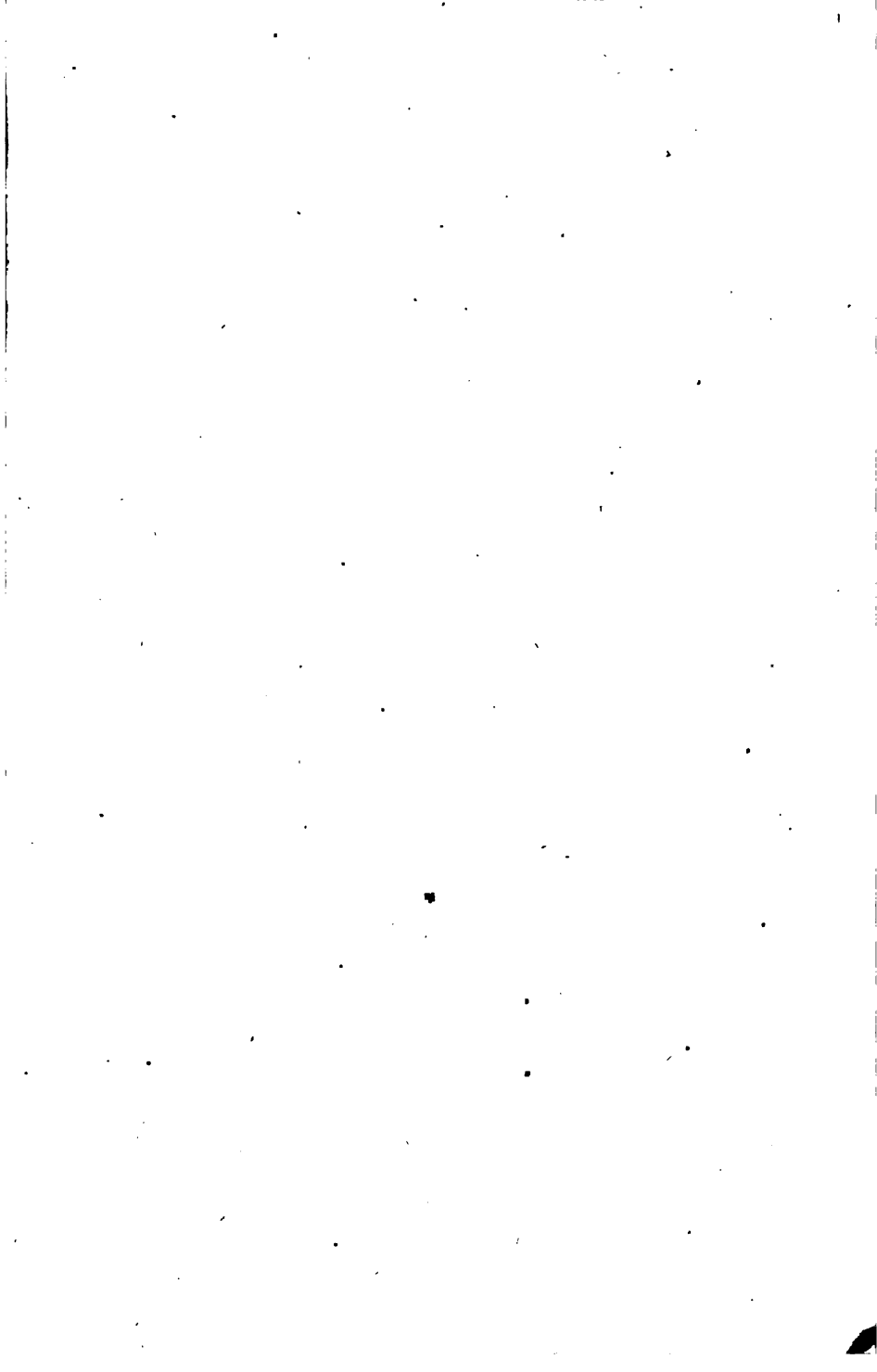




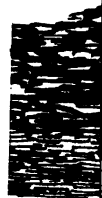
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*Printed only for Presents. Given to the Institution  
Oct. 1825, by the Rev. Dr. Cotton, Archbishop of Cashel.*

**DESCRIPTION**  
**OF THE**  
**SKELETON**  
**OF THE**  
**FOSSIL DEER OF IRELAND,**

**CERVUS MEGACEROS;**

**DRAWN UP AT THE INSTANCE OF THE COMMITTEE OF NATURAL  
PHILOSOPHY OF THE**

**ROYAL DUBLIN SOCIETY.**

---

**By JOHN HART,**

**MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND, &c.**

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**DUBLIN:**

**R. GRAISBERRY,**

**PRINTER TO THE ROYAL DUBLIN SOCIETY.**

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**1825.**

*Gough Ireland, Add.*



*Description of the SKELETON of the FOSSIL DEER OF  
IRELAND, (cervus megaceros,) in the MUSEUM of the  
ROYAL DUBLIN SOCIETY. By JOHN HART, Member  
of the Royal College of Surgeons in Ireland, &c.*

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**THERE** are few sciences for the advancement of which more has been effected within so short a space of time than for that of Comparative Anatomy; and when it is considered that it affords to those devoted to the study of the healing art the means of acquiring more correct ideas of the laws of life, by enlarging their views of the animal economy, there are few which can exert a more direct influence, in that respect, over the welfare of society.

It was little expected, however, that a more extended cultivation of this science would have led to a new train of highly interesting speculations regarding the changes which the surface of our globe may have undergone; speculations resting on the degree of certainty with which it is possible to ascertain that the fossil remains of particular genera are found exclusively in particular strata of the earth.

This proposition of drawing geological inferences from anatomical facts originated with the Baron Cuvier, who enjoyed opportunities which enabled him to cultivate Comparative Anatomy to a greater extent than, perhaps, any other individual living. Some idea of the nature of this great man's researches may be formed

when he avers that, from the examination of what might be considered a mere fragment of a bone, he could determine the genus of the animal to which it had belonged: nay, he has in some instances ventured to delineate what from analogical inferences he considered to have been the external forms of animals, of whose existence, even at some period far remote, we have no other kind of evidence save that derived from the occurrence of their less perishable parts in a fossil state.

From a combination of anatomical and zoological deductions, we may refer the various organic remains which occur in strata of alluvial formation to two divisions, one including those of animals belonging to species still in existence, the other comprising those of species which have long since become altogether extinct. Of this latter division there are none more deserving of our attention, or more calculated to give rise to feelings of surprise and admiration, than those bones and horns of enormous size belonging to an animal of the deer tribe, which are almost daily dug out of the bogs and marl pits of Ireland.

So frequently do these remains occur in most parts of this island, that there are very few of our peasantry who are not, either from personal observation or report, acquainted with them by the familiar name of the horns of "the old deer:" indeed in some parts of the country they have been found so often, that far from being regarded as objects of any extraordinary interest, they have been either thrown aside as useless lumber, or applied to the very commonest of economical uses.\*

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\* In a Report which I made to the Committee of Natural Philosophy of the Royal Dublin Society, and which was printed in their Proceedings of July 8, 1824, I alluded to an instance of a pair of these horns having been used as a field gate near Tipperary. Since that I have learned that

I have made diligent but fruitless search for an account of the particular time when any of these remains were first discovered. As they generally occur in marl, it is most likely that they did not begin to attract attention until the advanced state of agriculture had created an increased demand for that mineral as a manure. We can very easily imagine the astonishment which the appearance of horns so large, and of such strange form, must have excited in the minds of those who discovered them for the first time, and how readily they obtained a place in the hall of some adjoining mansion, where they were deposited as an ornament of great curiosity, from the contrast which they formed with the horns of the species of deer known at present. In this way we may account for the preservation of so many specimens as are found in the possession of the gentry in different parts of this country.

The other bones of the animal, although of a large size, yet to common observers appeared to be on a scale so far beneath that of the horns, that little or no attention was paid to them. This circumstance would appear extraordinary were it not considered that formerly there were in this country very few persons who had applied themselves to the study of Comparative Anatomy, except in a very superficial and general way. Hence they were not competent to form a correct estimate of the size of the animal of which these bones formed a part, much less of the points in which it resembled, or differed from, other animals in its organization.

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a pair had been in use for a similar purpose near Newcastle, County of Wicklow, until they were decomposed by the action of the weather : there is also a specimen in Charlemont House, the town residence of the Earl of Charlemont, which is said to have been used for some time as a temporary bridge across a rivulet in the County of Tyrone.

It is gratifying however to observe that the value of this science is now more duly appreciated amongst us, and the study of it is beginning to receive the attention which its high importance, in several points of view, demands.

One of the many causes which have operated in producing this favourable change is the recent commencement of a Museum of Comparative Anatomy by the Royal College of Surgeons in Ireland,\* an institution which, by bringing together, as it were, within the compass of a single view, the various modifications of structure presented by the several organs throughout the whole range of animated beings, affords to the student facilities on the obvious advantages of which it would be superfluous to insist; and which may be hailed as an auspicious omen of the opening of a new and important era in the annals of this science.

The interest excited by these remarkable animal remains increased in proportion as the particular branch of science alluded to was more zealously cultivated; and a complete skeleton of this stupendous animal had become a desideratum of first rate importance with the scientific world. The first tolerably perfect specimen was found in the Isle of Man, and presented to the

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\* Connected with the mention of this Museum is the recollection of my friend the late Mr. J. Shekelton, its first conservator, who devoted himself to the discharge of the duties of that office with a zeal which called forth exertions far beyond his physical powers, and which so impaired his constitution as to render him susceptible of that formidable febrile affection occasionally ensuing on wounds received in dissection, to which he fell a victim in May 1824. Thus was he cut off in early life, in the midst of his career to that honorable post to which his acquisitions and persevering industry would undoubtedly have advanced him, had Providence been pleased to spare him but for a few years longer.

Museum of the University of Edinburgh by the Duke of Athol a few years since. About the same time a considerable number of the bones of another, found in the county Down, was forwarded to the Museum of Trinity College by the Bishop of Dromore: these, at the request of Doctor Stokes, the learned Professor of Natural History to the University, I connected in the summer of 1823, by placing the several parts as nearly in their natural relations to each other as it was possible, considering that most of the vertebræ and many other bones of importance were deficient. The object I proposed was rather to shew what could be done, with a view to encourage visiters to the Museum to contribute whatever bones opportunity might place at their disposal, than to claim the credit of having given a correct representation of the form of the skeleton from such imperfect materials.

Thus much had been done towards accomplishing this very desirable object, when the following communication was made to the Royal Dublin Society, which I here transcribe from their Proceedings of April 22d, 1824.

“ The following letter from Lord Viscount Northland to the Hon. and Rev. John Pomeroy, V. P. together with the extract of a letter from the Archdeacon of Limerick, were read.”

“ MY DEAR SIR,

“ May I beg the favor of you to lay the enclosed paper before the Royal Dublin Society at their first meeting.

“ I am, &c.

“ NORTHLAND.”

“ *Hon. and Rev. John Pomeroy, V. P. R. D. S.*

“ *Dublin April 9th, 1824.*”



" Extract of a letter from the Rev. William Wray Maunsell, Archdeacon of Limerick, to Lord Viscount Northland, dated Limerick April 7th, 1824.

" In a communication from your Lordship, you intimated your approval of the fossil remains of the non-descript deer, which were found at Rathcannon, being presented to the Dublin Society; and I have, I confess, been induced to defer carrying this object into effect, which accords entirely with my views, in the hope that by discovering another perfect head and antlers I should be able to retain the one I have in my possession for myself; but as our operations in that part of the property in which these wonders were found, have ceased, I must, I believe, act the patriot, and request that your Lordship will intimate to your brother, Mr. George Knox, who is Vice President, that I shall be prepared any time after the 22d of this month to deliver to any one they may be disposed to authorize to receive them, the only skeleton of this extraordinary animal which I believe is to be found in the empire. It will, however, I think be expedient, that some person skilled in anatomy should be selected, as there is such a mass of the component parts of different deer, as would puzzle any but an adept in this science to make a proper selection from. I believe there are a few of the vertebræ of the back wanting, but there is every other bone, even to the bones of the tongue, the knee, the fetlock, and coffin bones of the foot, and all on a great scale; the marrow is also perfect in some of the bones, and though changed into spermaceti, blazes like a candle. I have also a skull of a dog of a large kind, (at least of a carnivorous animal,) which I found lying close to some of the remains, and which I will transmit with the bones of his old acquaintance.

" Should the Society, upon viewing the specimens, wish to receive an account of the circumstances under which they were discovered, I shall have great pleasure in transmitting them a detailed statement, as I was present when they were all raised."

This very handsome and liberal offer was eagerly embraced by the Society, who did me the honor to appoint me on that occasion to proceed to Limerick, for the purpose of making the proposed selection of materials for a skeleton, and on my return confided to my care the task of conducting the necessary process of articulating it, preparatory to its being deposited in their Museum of Natural History, in which it now stands.

The statement of the circumstances under which the bones were found, with their geological position, alluded to in the concluding paragraph of the extract above quoted, has been lately laid before the Society, in a letter from Archdeacon Maunsell to the Right Hon. George Knox, V. P. as follows:

" The following letter from Archdeacon Maunsell to the Right Hon. G. Knox, V. P. being read :"

*" Middleton Lodge, March 8, 1825.*

" MY DEAR SIR.

" I deferred replying to your letter of the 1st, as it was my intention to proceed to Limerick in a few days, and I was anxious to look over some notes I had taken, and which I left there, of the circumstances connected with the discovery of the fossil remains which the Royal Dublin Society have received. As I have, however, been obliged to postpone my departure for several days, I can no longer defer offering my best thanks for the

kind manner in which you have received the conjectures which I formed upon a subject to which my attention was directed, by having fortunately been present before the bones were disturbed from the situation in which they had lain during a period which I apprehend it would not be easy to define. I am sensible that any consideration which may have been attached to my observations should be attributed to the interest which the subject itself is calculated to excite, rather than to any ability of mine to do it justice. The opinion which I took the liberty of communicating to you was formed after some consideration, and although I had not the most remote idea of its being worthy of any attention, I can have no objection to your making any use of it which you may conceive expedient. There is, I conceive, much interesting material for speculation, resulting from the discovery of these fossil remains, and the first that naturally occurs is the manner in which the animals were destroyed, and the bones so singularly preserved. I stated, in the hasty sketch which I gave you of my theory upon this point, that I apprehended they must have been destroyed by some overwhelming deluge, that they were probably drowned upon the hills where they had taken refuge, as the waters rose, and that, as they subsided, they were drawn from thence into the valley in which they were found; that the agitation of the waters had occasioned such a dispersion of the bones, when the ligaments dissolved, as would account for their having been scattered in the way in which they were found, and that the deposit of shell marl, with which I supposed the water to have been turbid, had so completely protected them from atmospheric influence as to prevent their subsequent decomposition. To enable you to form some estimate of the reasonableness of this supposition, it is necessary that I should endeavour to

explain the situation, &c. of the valley and the adjoining hills. The valley in which the remains were found contains about twenty plantation acres, and the soil consists of a stratum of peat about a foot thick, immediately under this a stratum of shell-marl, varying from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  feet in thickness; in this many of the shells retain their original colour and figure, and are not marine; under the marl there is a bed of light blue clay; through this one of my workmen drove an iron rod, in several places, twelve feet deep, without meeting opposition. Most of the bones and heads, eight in number, were found in the marl; many of them, however, appeared to rest on the clay, and to be merely covered by the marl. The remains were disposed in such a manner as to prevent the possibility of ascertaining the exact component parts of each skeleton; in some places portions were found removed many yards from others, and in no instance were two bones found lying close to each other. Their position also was singular; in one place two heads were found, with the antlers entwined in each other, and immediately under them a large blade bone; in another, a very large head was discovered, and although a most diligent search was made, no part of the skeleton found; within some hundred yards, in another, the jaw-bones were found, and not the head. The conclusion which, I conceive, may fairly be deduced from such a position of the various parts of the animals is, that there must have been some powerful agent employed in dispersing them after their death; and as I consider it impossible that their own gravity could have been sufficient to sink them through the various strata, I conceive these must have originated subsequently to the dispersion of the bones. I also think, that if they had been exposed for any time to atmospheric influence

they never could have been preserved in their present extraordinary perfection.

“ The hills immediately adjoining this valley are composed of limestone, with a covering of rich mould of various degrees of thickness. One of them, whose base is about thirty acres, rises directly from the edge of the valley, with sides very precipitous, and in one place perfectly perpendicular, of naked limestone. In every part of this hill the superficies comprises as much stone as mould; on the side nearly opposite, the hill is equally high, but the sides not so steep, and the covering of mould thicker; on the other sides the ground only rises in some degree (twenty or thirty feet perhaps) and consists of a thin mould, and immediately under a *very hard* limestone gravel. Indeed, except where limestone forms the substratum, this is the character of all the soil in the vicinity except the Corkasses, which are evidently alluvial. I am fully aware, that assuming the destruction of the animals to have been occasioned by a flood, they would naturally have retreated from the water to the hills, and that, as they probably met their fate there, their remains should have been discovered on the summit of the hills, and not in the valley, particularly as one of them is perfectly flat on the top, which contains six or seven acres. I apprehend that the remains of many of them were deposited on the tops of the hills, but as they have *now* only a slight covering of mould, not sufficient to cover a small dog, they were formerly perfectly bare; and as they were thus devoid of the means of protecting the remains from the atmosphere, whatever was left there soon became decomposed, and resolved into portions of the mould, which is now to be found on the hills. This remark I conceive also to be applicable to the soil with the substratum of limestone gravel, which affords quite

as little material for preserving the bones as the hills do.

"It is material that I should observe that of eight heads, which we found, none were without antlers; the variety in character also was such as to induce me to imagine, that possibly the females were not devoid of these appendages; unfortunately, however, from the difficulty of raising them, being saturated with water, and as soft as wet brown paper, only three were at all perfect. Having now disposed of these antediluvians, a question naturally arises how it happens that the fossil remains of no other animals were found, when the same fate probably overwhelmed every existing creature? Could deer have been the only living beings at that period? Was Ireland part of a great continent when this catastrophe occurred, and were these unfortunates the first emigrants to our Isle from that great centre, from whence the Globe was supplied with occupants, and did they perish before other animals less influenced by enterprise, and less endowed with physical strength, could have followed their example? These problems I confess myself unable to solve, and shall not presume to obtrude my many reveries upon this and other points, which have originated in the discovery of a few bones, upon those who I know are so much better competent to form a sound opinion. I shall, I hope, be able to send the antlers, which are very fine, on the 15th of this month.

"If you have a desire to make any use of this letter, I can only say I can have no objection. I remain, dear Sir, with feelings of great respect,

"Your's most truly,

"WILLIAM W. MAUNSELL."

Although it is obvious that the interests of science can be more effectually promoted by the cooperation of its cultivators, regardless of these artificial distinctions originating in difference of nation, or party, still it must be admitted that such distinctions are not altogether unattended with benefit, so far as they are made a source of honorable emulation.

With this qualification we may well be excused in the present instance, for feeling a degree of national pride that our Native Institution for the encouragement of the Arts and Sciences, should have been the first public body in Europe to obtain a perfect specimen of the skeleton of this, one of the most remarkable animals which ever existed; and which, although not exclusively indigenous to, yet seems to have had its favourite haunts in our fertile plains and vallies.\*

This magnificent skeleton is perfect in every single bone of the framework, which contributes to form a part of its general outline: the spine, the chest, the pelvis, and the extremities, are all complete in this respect; and when surmounted by the head and beautifully expanded antlers, which extend out to a distance of nearly six feet on either side, forms a splendid display of the reliques of the former grandeur of the animal kingdom, and carries back the imagination to a period when whole herds of this noble animal wandered at large over the face of the country.

To proceed with a description of the several parts of this specimen in detail, I shall commence with the

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\* Portions of these remains have been found in Yorkshire, and by Parkinson on the coast of Essex. They have been found in the Isle of Man, different parts of Germany, in the forest of Bondi near Paris, and, according to Cuvier, in many parts of Lombardy near the Po.

horns, which give the animal its chief characteristic feature.

The horns.—That the description of these may be the more intelligible, I will first explain the terms which I mean to apply to their several parts. Each horn consists of the socket or root, the burr or coronary circle, the beam or shaft, the palm and the antlers.

The socket or root is the part of the horn which grows out of the frontal bone, and which is never shed; it is smooth, of a brown colour, an inch and half in length, and eleven inches three quarters in circumference; in the animal's life time it was covered by the skin. The coronary or bead-like circle, or burr, is a ring of small, hard, whitish prominences, resembling a string of pearls, which encircles the junction of the socket with the part of the horn which falls annually from the heads of all deer.

The beam or shaft extends outwards with a curvature whose concavity looks downwards, and backwards. This part is nearly cylindrical at its root, and its length equals about one-fourth of that of the whole horn; its outer end is spread out and flattened on its upper surface, and is continuous with the

Palm, which expands outwards in a fan-like form, the outer extremity of which measures two feet ten inches across, being its broadest part. Where the beam joins the palm the horn undergoes a kind of twist, the effect of which on the palm is, to place its edges above and below, and its surfaces anterior and posterior; the anterior surface is convex, and looks outwards; the posterior is concave, and its surface looks towards that of the opposite palm. Such is the position of the horns, when the head is so placed that the zygomatic arch is parallel to the horizon, as it



would be during progression, or whilst the animal stands in an easy posture.

The antlers are the long pointed processes which project from the horns, two of which grow from the beam anteriorly; the first comes off immediately from the root, and is directed downwards, overhanging the orbit; this is called the brow antler, which in this specimen is divided into two points at its extremity.\*

The other antler, which comes off from the beam, we may call the sur-antler: in this specimen it consists of a broad plate or palm, concave on its upper surface, horizontal in its direction, and forked into two points anteriorly, an appearance which I have not observed in any other specimen of upwards of forty which I have seen, nor do I find it marked in any of the plates of those bones extant.

There is one antler given off posteriorly from the junction of the beam with the palm: it runs directly backwards parallel to the corresponding one of the opposite horn. The inferior edge of the palm beyond this runs outwards and backwards: it is obtuse and thick, and its length is two feet six inches. From the anterior and external borders of each palm there come off six long pointed antlers. None of these are designated by any particular name. The number of the antlers of both sides taken together is twenty-two.

The surface of the horns is of a lightish colour, resembling that of the marl in which they were found;

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\* I have seen this antler divided into three points in two specimens, one at the Earl of Besborough's, county Kilkenny, (which measured eight feet four inches between the tips,) the other in the hall of the Museum of Trinity College: it is single in the greater number of specimens, as in those which Cuvier describes.

they are rough, and marked with several arborescent grooves where the ramifications of the arteries by which they had been nourished during their growing state were lodged. The horns, with the head attached, weighed eighty-seven pounds avoirdupois. The distance between their extreme tips in a right line is nine feet two inches.

**Head.**—The forehead is marked by a raised ridge extended between the roots of the horns; anterior to this, between the orbits and the root of the nose, the skull is flat; there is a depression on each side in front of the root of the horn and over the orbit capable of lodging the last joint of the thumb, at the bottom of which is the superciliary hole, large enough to give passage to an artery proportioned to the size of the horns. Inferior to the orbit we have the lachrymatory fossa, and the opening left by the deficiency of bone common to all deer, and remarkable for being smaller in this than in any other species.

Below the orbits the skull grows suddenly narrower, and the upper parts of the nasal bones become contracted by a depression on either side, at the lower part of which is the infra orbital hole. The opening of the nares is oval, being five inches long by three broad, the greatest breadth being in the centre. From the roots of the horns to the occipital spine measures three inches and an half; the occiput descends at a right angle with this, being three inches deep to the foramen magnum: the greatest breadth of the occiput is eight inches. The temporal fossæ approach to within two inches of each other behind the horns.

**Teeth.**—They do not differ from those of animals of the ruminating class. The incisors were not found, having dropped out; there is no mark of canine teeth;

the molares are not much worn down, and are twenty-four in number.

The skeleton measures, from the end of the nose to the tip of the tail, ten feet ten inches. The spine consists of twenty-six vertebræ, viz. seven cervical, thirteen dorsal, and six lumbar. The size of the cervical vertebræ greatly exceeds that of the other classes, and the spines of the dorsal rise to a foot in height. The necessity of these bones being so marked is obvious, considering the strong cervical ligament, and powerful muscles, required for supporting and moving a head which, at a moderate calculation, must have sustained a weight of three quarters of a hundred of solid bony matter.

The extremities are in proportion to the different parts of the trunk, and present a conformation favourable to a combination of great strength with fleetness.

It is not the least remarkable circumstance connected with these bones, that they are in such a high state of preservation as to present all the lines and impressions of the parts which had been attached to them in the recent state. Indeed if we examine them as compared with the bones of an animal from which all the softer parts have been separated by maceration, the only perceptible differences in their physical properties are, that they are a little heavier, a degree harder, that their surface is brown, and that they all, with the exception of the horns, present a polished appearance, which is owing to the periosteum having been preserved, and still remaining to cover them, as was discovered when they were chemically examined.

The existence of fat or adipocire in the shaft of one of the bones mentioned by Archdeacon Maunsell, and which I saw in his possession, is a thing for which it is extremely difficult to account, as it occurred but in one

solitary instance, and it did not appear that this bone was at all differently circumstanced from the rest. Those which I had an opportunity of examining, by boring holes in them, were hollow, and contained, for the most part, only a small quantity of black animal earth.

I requested my friend Mr. W. Stokes to make an analysis of a small fragment of a rib, which he found to contain the following constituents :

|                                      |        |
|--------------------------------------|--------|
| Animal matter, ... ..                | 42.87  |
| Phosphates with some Fluates, ... .. | 43.45  |
| Carb. Lime, ... ..                   | 9.14   |
| Oxides, ... ..                       | 1.02   |
| Silica, ... ..                       | 1.14   |
| Water and loss, ... ..               | 2.38   |
|                                      | <hr/>  |
|                                      | 100.00 |

With a view to ascertain the state of the animal matter, I had a portion of bone submitted to chemical examination by my friend Dr. Apjohn, at the laboratory of the New Medico-Chirurgical School, Park-street, of the result of which he gave me the subjoined statement :

" I regret that time did not permit my making a more particular examination of the Moose Deer-bone, which was left by you at my laboratory. Knowing that you were in possession of a tolerably correct analysis of its earthy materials, my attention was directed to its animal constituents, which, as the following experiments establish, were found in a state of perfect preservation.

" The bone was subjected for two days to the action of dilute Muriatic Acid. When examined at the end

of this period, it had become as flexible as a recent bone submitted to the action of the same solvent. The periosteum was in some parts puffed out by Carbonic Acid Gas, disengaged from the bone, and appeared to be in a state of perfect soundness.

"To a portion of the solution of the bone in the Muriatic Acid some infusion of galls was added, which caused a copious precipitate of a dun colour. This proved to be Tannate of Gelatine, mixed with a small portion of the Tannate and Gallate of Iron.

"The cartilage and gelatine therefore, so far from being destroyed, had not been perceptibly altered by time.

"Your's very sincerely,

"JAMES APJOHN."

Such result I had expected, and I ventured to predict it in my report already alluded to.\*

Until Baron Cuvier published his account of these remains,† they were generally believed to have belonged to the same species as the moose deer or elk of North America, an opinion which appears to have been first advanced by Dr. Thomas Molyneux in 1697,‡ and which depends principally on the exaggerated description of that animal given by Josselyn in his account of two voyages to New England, published in 1674, in

\* A gentleman told me of a bonfire which was made of a heap of these bones in a village in the county of Antrim, in celebration of the battle of Waterloo, and the bones were observed to give as good a blaze as the bones of horses, which are usually employed on such occasions.

† Vide Annales du Museum d'Histoire Naturelle, Tom. XII, et Ossements Fossiles, Tom. IVème.

‡ Philosophical Transactions, Vol. XIX.

which he states that it is sometimes twelve feet high, with horns of two fathoms wide ! This was the more readily believed by the learned Doctor, as it tended to confirm him in a favourite theory which he seems to have entertained, that Ireland had once been joined to the New Continent.

But the assertions of Josselyn regarding the size of the American moose have not been confirmed by the testimony of later travellers, from whose observations it is now clearly ascertained that the only large species of deer inhabiting the northern parts of America are the wapiti or Canadian stag, (*Cervus Canadensis*,) the reindeer, (*C. Tarandus*,) and the moose or elk, (*C. Alces*.)

The peculiar branching of the brow antlers of the reindeer, and the rounded horns of the wapiti,\* are characters sufficient to prevent us confounding either of these animals with the fossil species.

The palmate form of the horns of the elk gave greater probability to the opinion of its specific identity with the fossil animal.

A little attention, however, to a few circumstances, will shew a most marked difference between them.

First, as to size, the difference is very remarkable, it not being uncommon to find the fossil horns ten feet between the extreme tips,† while the largest elk's horns never measure four feet. This measurement in a pair in the Museum of the Royal Dublin Society is three

\* A fine pair of this species, male and female, were exhibited by Mr. Bullock in this city a few summers ago. They did not answer to any description of Pennant or of Dr. Shaw, but had the characters of *C. Canadensis* as given by Cuvier.

† Dr. Percy, Bishop of Dromore, describes a pair which measured fourteen feet by the skull. *Archæologia Britt.* Vol. VII.

feet seven inches: the largest pair seen by Pennant in the house of the Hudson's Bay Company measured thirty-four inches.\*

The horn of the elk has two palms, a lesser one which grows forward from the front of the beam where the principal palm begins to expand. This is called brow antler by Cuvier, but it corresponds in situation rather to the sur-antler, there being, properly speaking, no brow antler attached to the root of the beam. The elk has no posterior antler similar to that of the fossil animal, nor does its beam take a similar arched direction, but runs more directly outwards.

Cuvier remarks, that the palm of the fossil horn increases in breadth as it extends outwardly, while that of the elk is broadest next the beam.

The palm of the elk's horn is directed more backwards, while the fossil one extends more in the lateral direction. The antlers of the elk are shorter and more numerous than those of the fossil.

As the horns of the fossil animal exceed in size those of the elk, so on the contrary does the skull of the latter exceed in size that of the former; the largest heads of the fossil species not exceeding one foot nine inches in length, while the head of the elk is frequently two feet. The fossil head is broader in proportion; its length being to its breadth as two to one; in the elk they are as three to one, according to Parkinson.† The breadth of the skull between the roots of the horns is but four inches in the fossil skulls; in that of the elk in the Society's Museum it is  $6\frac{1}{2}$  inches.

Cuvier thinks it probable that the females of the fossil

\* Pennant's Zoology, Vol. I.

† Organic remains, Vol. III.

species had horns,\* an opinion to which I am very much disposed to subscribe, from having observed that these parts present differences in size and strength, which appear not to be dependent on differences of age; for instance, the teeth of the specimen in Trinity College are much more worn down, and the sutures of the skull are more effaced than in the specimen described in this paper; yet the horns of the latter are much more concave, and more expanded than those of the former; and on comparing a single horn of each of these specimens together, that belonging to the Society exceeds the other by nearly a sixth in the length, and little less than a third in the breadth; it is not therefore unlikely that the animal whose horns were larger and more curved was a male. Something similar to this is observed in the rein-deer, both sexes of which have horns, but with this difference, that they are smaller and less branched in the female. Hence we find that this animal possessed characters of its own sufficient to prove it of a species as distinct from the moose or elk as this latter species is from the rein-deer or any other; therefore, it is improper to retain the name of elk or moose deer any longer; perhaps it might be better called the *Cervus megaceros*, a name merely expressive of the great size of its horns.

That this animal shed its head furniture periodically, is proved by the occasional occurrence of detached horns having the smooth convex surface below the burr, similar to what is observed on the cast horns of all deer. Specimens of this are to be seen in the Museum of Trinity College, and I possess one myself, of which I have

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\* Ossemen's Fossiles, Tom. IV.



had a drawing made. As every other species of deer shed their horns annually, there is no reason for supposing that that process occurred at longer intervals in this.

It is a popular opinion with the Indians that the elk is subject to epilepsy, with which he is frequently seized when pursued, and thus rendered an easy prey to the hunters. Many naturalists affect to disbelieve this account, without, however, assigning any sufficient reason. But if it be considered, that during the growth of the horns there must be a great increased determination of blood to these parts, which are supplied by the frontal artery, a branch from the internal carotid, it is quite conformable to well established pathological principles to suppose, that after the horns are perfected, and have ceased to receive any more blood, that fluid may be determined to those internal branches of the carotid which supply the brain, and establish a predisposition to such derangements of its circulation as would produce epilepsy, or even apoplexy: if such an effect were produced in consequence of the size of the horns in the elk, it is reasonable to suppose that it prevailed in a greater degree in the fossil animal whose horns were so much larger.

What could have been the use of these immense horns? It is quite evident that they would prevent the animal making any progress through a thickly wooded country, and that the long, tapering, pointed antlers were totally unfit for lopping off the branches of trees, a use to which the elk sometimes applies his horns,\* and

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\* The elk, when pursued in the forests of North America, breaks off branches of trees as thick as a man's thigh.

for which they seem well calculated, by having their antlers short and strong, and set along the edge of the palm, somewhat resembling the teeth of a saw in their arrangement. It would rather appear then, that they were given the animal as weapons for its protection, a purpose for which they seem to have been admirably designed; for their lateral expansion is such, that should occasion require the animal to use them in his defence, their extreme tips would easily reach beyond the remotest parts of his body; and if we consider the powerful muscles for moving the head, whose attachments occupied the extensive surfaces of the cervical vertebræ, with the length of the lever afforded by the horns themselves, we can easily conceive how he could wield them with a force and velocity which would deal destruction to any enemy having the hardihood to venture within their range.

From the formidable appearance of these horns then, we must suppose that their possessor was obnoxious to the aggressions of some carnivorous animals of ferocious habits; and such we know to have abounded in Ireland, as the wolf, and the celebrated Irish wolf dog. Nor would it be surprising if limestone caves should be discovered in this country containing the remains of beasts of prey and their victims, similar to the hyæna's dens of Kirkdale, and other places, respecting which such interesting researches have been lately laid before the public by Professor Buckland, of the University of Oxford.

The absence of all record, or even tradition respecting this animal,\* naturally leads one to enquire whe-

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\* It is evidently not the animal mentioned by J. Cæsar, under the name of *Alces*, vide *Comment. de Bello Gallico* VI. *Caput X.* Nor is it the *Alces* of Pliny.

ther man inhabited this country during its existence? I think there is presumptive evidence in the affirmative of this question afforded by the following circumstances; a head of this animal described by Professor Goldfuss of Bonn, was discovered in Germany in the same drain with several urns and stone hatchets; and in the 7th volume of the *Archæologia Britannica*, is a letter of the Countess of Moira, giving an account of a human body found in gravel, under eleven feet of peat soaked in the bog water:—it was in good preservation, and completely clothed in antique garments of hair, which her ladyship thinks might have been that of our fossil animal. But more conclusive evidence on this question is derived from the appearance exhibited by a rib, presented by Archdeacon Maunsell to the Royal Dublin Society, in which I discovered an oval opening near its lower edge, the long diameter of which is parallel to the length of the rib, its margin is depressed on the outer, and raised on the inner surface, round which there is an irregular effusion of callus. This opening was evidently produced by a sharp pointed instrument, which did not penetrate so deep as to cause the animal's death, but which remained fixed in the opening for some length of time afterward; in fact such an effect as would be produced by the head of an arrow remaining in a wound after the shaft was broken off.\*

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\* I am well aware of the occasional existence of holes in the ribs, a few instances of which I have seen in the human subject: but they differ essentially in character from the opening here described, as they occupy the centre of the rib, mostly at its sternal extremity, and have their margin depressed on both sides.

It is not improbable, therefore, that the chase of this gigantic animal once supplied the inhabitants of this country with food and clothing.

As to the causes which led to the extinction of this animal, whether it was suddenly destroyed by the deluge, or by some other great catastrophe of nature, or whether it was ultimately exterminated by the continued and successful persecution of its pursuers, as has nearly been the case with the red deer within the recollection of many of the present generation, I profess myself unable to form any decided opinion, owing to the limited number of facts as yet collected on the subject. On some future occasion I may, perhaps, be induced to revert to so interesting a topic, should I have opportunities of discovering any thing worthy of communication.

The following Table exhibits a comparative view of the measurements of different parts of the skeletons of the *Cervus Megaceros* in the Museum of the Royal Dublin Society, and in the University of Edinburgh, with some parts of the Moose.

|   | R. D. Soc. |     | U. of Edin. |     | Moose |     |
|---|------------|-----|-------------|-----|-------|-----|
|   | Ft.        | In. | Ft.         | In. | Ft.   | In. |
| Length of the head, ... ..                                    | 1          | 8½  | 1           | 8½  |       |     |
| Breadth of the skull between<br>the orbits, ... ..            | 0          | 10½ | 0           | 9   |       |     |
| Breadth of the skull at the oc-<br>ciput, ... ..              | 0          | 8   |             |     |       |     |
| Diameter of the orbit, ... ..                                 | 0          | 2½  | 0           | 2½  |       |     |
| Distance between infra orbital<br>holes across the skull, ... | 0          | 7   |             |     |       |     |
| Length of alveolar processes<br>of the upper jaw, ... ..      | 0          | 6   | 0           | 6   |       |     |
| Length of lower jaw, ... ..                                   | 1          | 5½  | 1           | 3½  |       |     |
| Diameter of foramen magnum,                                   | 0          | 2   |             |     |       |     |
| HORNS.  |            |     |             |     |       |     |
| Distance between the extreme<br>tips, measured by the skull,  | 11         | 10  |             |     |       |     |
| Ditto, in a straight line across,                             | 9          | 2   | 6           | 8   | 3     | 7   |
| Length of each horn, ... ..                                   | 5          | 9   | 5           | 1   |       |     |
| Greatest breadth of the palm,                                 | 2          | 10  |             |     |       |     |
| Length of the beam, ... ..                                    | 1          | 9   |             |     | 0     | 6½  |
| Ditto of brow antler, ... ..                                  | 0          | 8½  |             |     |       |     |
| Ditto of sur-antler, ... ..                                   | 1          | 4   |             |     |       |     |
| Circumference of the beam at<br>the root of the brow antler,  | 1          | 0½  |             |     | 0     | 7½  |

|  | R. D. Sec. |                  | U. of Edin. |                 | Moose. |     |
|--|------------|------------------|-------------|-----------------|--------|-----|
|  | Ft.        | In.              | Ft.         | In.             | Ft.    | In. |
| <b>BODY.</b>   |            |                  |             |                 |        |     |
| Length of spine, ... ..  | 10         | 10               | 9           | 8               | —      | —   |
| Ditto of sternum, ... ..   | 2          | 4                | —           | —               | —      | —   |
| Height to the upper extremity<br>of the dorsal spines, ... ..                | 6          | 6                | —           | —               | —      | —   |
| Ditto to the highest point of<br>the tip of the horn, ... ..                 | 10         | 4                | —           | —               | —      | —   |
| <b>EXTREMITIES.</b>  |            |                  |             |                 |        |     |
| Greatest length of the scapula,  | 1          | 6 $\frac{1}{2}$  | —           | —               | —      | —   |
| Ditto breadth at the base,   | 0          | 10 $\frac{1}{4}$ | —           | —               | —      | —   |
| Ditto depth of its spine, ... ..   | 0          | 2 $\frac{1}{4}$  | —           | —               | —      | —   |
| Length of the humerus, ... ..  | 1          | 4                | 1           | 3 $\frac{1}{2}$ | —      | —   |
| Ditto of ulna and radius, ... ..   | 1          | 8                | 1           | 6               | —      | —   |
| Ditto of carpus, ... ..  | 0          | 2 $\frac{1}{4}$  | 0           | 2               | —      | —   |
| Circumference of do. ... ..  | 0          | 9 $\frac{1}{2}$  | —           | —               | —      | —   |
| Length of metacarpus, ... ..   | 1          | 0 $\frac{1}{2}$  | 1           | 0 $\frac{1}{2}$ | —      | —   |
| Length of phalanges, ... ..  | 0          | 7                | 0           | 6 $\frac{1}{2}$ | —      | —   |
| From anterior superior spine of<br>one ileum to that of the<br>other, ... .. | 1          | 4 $\frac{1}{2}$  | 1           | 6 $\frac{1}{2}$ | —      | —   |
| From anterior superior spine<br>to the tuber ischii, ... ..                  | 1          | 8                | 1           | 9 $\frac{1}{2}$ | —      | —   |
| Greatest diameter of foramen<br>ovale, ... ..                                | 0          | 4                | 0           | 3               | —      | —   |
| Least do. of do. ... ..  | 0          | 2 $\frac{1}{4}$  | 0           | 2 $\frac{1}{4}$ | —      | —   |
| Length of the femur, ... ..  | 1          | 6 $\frac{1}{2}$  | 1           | 5 $\frac{1}{2}$ | —      | —   |
| Ditto of tibia, ... ..   | 1          | 6                | 1           | 6               | —      | —   |
| Length of the tarsus, including<br>the os calcia, ... ..                     | 0          | 8                | —           | —               | —      | —   |
| Ditto of the metatarsus, ... ..  | 1          | 1 $\frac{1}{4}$  | 1           | 1 $\frac{1}{4}$ | —      | —   |



## EXPLANATION OF THE PLATES.

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### PLATE I.

An accurate view of the skeleton, as it appears on entering the Museum: it is represented in rather an oblique view, in order that the form of the horns may be better shewn. It is reduced to one-fourteenth of the natural size.

### PLATE II.

#### FIG. 1.

A larger view of the head, in which the different markings are faithfully delineated, and the expansion of the horns shown in a front view: in this is also seen the peculiar forked appearance of the sur-antler.

#### FIG. 2.

The portion of cast horn mentioned at page 23, having the smooth convex surface at its root.

#### FIG. 3.

An internal and external view of the perforated rib described in page 26.



